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10/040,797	01/07/2002	Neil J. Goldfine	1884.1015-006	3789

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/040,797	Applicant(s) GOLDFINE ET AL.	
	Examiner Jeffrey R. West	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,3,5-17,22-25, and 28-32* is/are pending in the application.

4a) Of the above claim(s) *22-25,28 and 29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,3,5-17, and 30-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2, 3, 5-9, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,453,689 to Goldfine et al. in view of Zaretsky et al., "Continuum Properties from Interdigital Electrode Dielectrometry".

Goldfine discloses apparatus, devices, methods, and techniques for non-contact measurement of physical and kinematic properties of a material under test comprising, in one embodiment, an electromagnetic structure capable of imposing an electric field in the material under test when driven by an electrical signal and sensing an electromagnetic response, an analyzer for applying an electric signal to the electromagnetic structure and sensing the response, and a property estimator for translating the sensed response into estimates of one or more pre-selected properties of the material (column 6, lines 21-57). Goldfine discloses defining a dynamic range and property estimate tolerance requirements for pre-selected properties of the material under test (i.e. operating point parameters), geometric and configuration properties for an electromagnetic apparatus, and a continuum model for generating property estimation grids for the pre-selected material properties as

well as operating point response curves for pre-selected operating point parameters (column 6, line 58 to column 7, line 2). Goldfine discloses analyzing the grids and curves using a sensed electromagnetic response at each operating point, and performing property estimation over the defined range using the estimation grids and operation curves (column 7, lines 3-17). Goldfine discloses using the grids and operation curves to optimize the operating parameter points, and sensor and material structures (column 25, lines 34-52).

In another embodiment, Goldfine discloses defining physical and geometric properties for a material under test including pre-selected properties of the material under test (column 7, lines 24-26), such as physical, geometrical, and dimensional properties (column 13, lines 9-10). Goldfine discloses defining operating point parameters and geometric properties for the magnetometer (column 7, lines 26-28) and applying all the parameters/values into a model to compute an input/output terminal relation value that is a response value of transimpedance magnitude and phase, with the magnitude and phase being equivalent to real and imaginary parts (column 1, lines 24-25). Goldfine discloses recording the terminal relation value and repeating the process after incrementing the pre-selected properties of the material under test and repeating this process until desired conditions are met at which time the terminal relation values are plotted to form a multidimensional magnitude-phase property estimation grid (column 7, lines 29-37, column 9, lines 56-59, and Figure 29) and analyzing the property estimation grid to determine a fitness for a particular measurement (column 23, lines 15-21). Goldfine also discloses that the overall

property estimation grid plots contain a magnitude-magnitude plot of conductivity magnitude, represented by a first axis, versus a non-dielectric determined foil thickness magnitude (i.e. delta), represented by a second axis (Figure 29).

Goldfine discloses the magnitude-magnitude plot providing at least two values of thickness and conductivity (column 9, lines 56-60 and Figure 29) and recording a terminal relation value for each thickness and conductivity (column 25, lines 12-24) wherein the conductivity varies the field penetration/skin depth relative to the material properties (column 29, lines 29-36 and column 32, lines 3-8).

Further, although Goldfine doesn't specifically disclose a database for storing the terminal relation value as a property estimation grid point, it is considered inherent that in order for the method to plot a plurality of terminal relation values obtained over time in an estimation grid, there must be some storage medium/database for saving the values until they are plotted.

Goldfine also discloses performing the aforementioned steps as well as adjusting the pre-selected property of the material under test to compute another terminal relation value and corresponding Jacobian elements, defined as the variation in a computed terminal relation value due to variation in the pre-selected material property (column 7, lines 47-55), computing a singular value decomposition for the Jacobian elements to obtain singular values, singular vectors, and condition numbers of the Jacobian elements (column 7, lines 56-63) to evaluate the magnetometer and operating point parameters, and adjusting the magnetometer

model values and repeating the process until desired estimates are achieved (column 7, lines 59-67).

Goldfine also discloses choosing the model operation based upon the range of the excitation frequency and therefore it is considered inherent that this parameter must first be defined before being inputted into the model to allow proper model selection (column 6, lines 35-57).

With respect to claims 7 and 8, Goldfine also discloses plotting the magnitudes at the same wavelength, or as a function of multiple wavelengths (column 18, lines 23-34).

With respect to claim 13, Goldfine discloses using the singular values, singular vectors, and condition numbers to obtain property estimates and also discloses storing these values used to calculate the property estimates with grid points (column 17, lines 3-9).

As described above, Goldfine teaches many of the features of the claimed invention. Goldfine also teaches that these apparatus and methods are for use in either magnetometer or dielectrometer applications depending on the range of the excitation frequency (column 6, lines 35-57). Goldfine, however, does not teach a corresponding structure specific to the dielectric operation or the corresponding defined parameters required for dielectric property estimation (i.e. electrode parameters).

Zaretsky teaches a modal apparatus for deriving a model that makes an interdigital electro microdielectrometer applicable to measuring continuum

parameters in a wide range of heterogeneous media comprising defining pre-selected electrical properties of a material (i.e. surface capacitance density), wherein the surface capacitance density also defines all the heterogeneity and structure of the substrate medium (i.e. physical/geometric properties), and electrode geometry and configuration (i.e. electrode structure and spacing) (page 900, column 1, paragraph 2). Zaretsky teaches inputting these defined properties/configuration data into a model to compute an input/output terminal response/relation value (page 900, column 2, paragraph 1). Zaretsky also teaches using these values to determine phase grids/graphs based upon the model output (page 906) and also specifies a material for testing as a viscous curable epoxy (page 899, column 2, paragraph 2) and, although not specified by Zaretsky, a curable epoxy has the inherent properties as being both a liquid mixture and a semi-insulating material (See U.S. Patent No. 5,763,901 to Komoto et al. column 5, lines 57-60 and JP Publication No. 56-151538 to Isobe et al., Constitution).

It would have been obvious to one having ordinary skill in the art to modify the invention of Goldfine to include a corresponding structure specific to the dielectric operation and the corresponding defined parameters required for dielectric property estimation (i.e. electrode parameters), as taught by Zaretsky, because Goldfine teaches use of the method and apparatus for sensing properties outside the range of normal magnetometers and dielectrometers (column 6, lines 10-21) and suggests that the general method and apparatus can be used to calculate dielectric property estimations with the addition of a specific structure and parameters (column 22, lines

49-54). Thereby, Zaretsky teaches this required structure and required parameters for applying the method of Goldfine for a dielectrometer structure rather than only a magnetometer structure in order to achieve desired frequency responses and property estimations over a wide range of heterogeneous media (abstract and page 900, column 1, paragraph 1).

3. Claims 10 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Goldfine et al. in view of Zaretsky et al. and further in view of U.S. Patent No. 4,773,021 to Harris et al.

As noted above, the invention of Goldfine and Zaretsky teaches many of the features of the claimed invention and while the invention of Goldfine and Zaretsky does teach computing a terminal relation value for each of a conductivity and a thickness (Goldfine, column 7, lines 29-37, column 9, lines 56-59, and Figure 29) wherein the conductivity is sensed by a current sensor (Goldfine, column 45, lines 12-17) and the thickness is sensed by a non-dielectric micrometer sensor (Goldfine, column 46, lines 27-30), the combination does not specifically indicate that the conductivity is sensed by a dielectric sensor.

Harris teaches an adaptive model-based pressure control and method of resin cure including means for sensing conductivity using a dielectric sensor (column 4, lines 28-32) as part of a dielectrometer (column 3, lines 4-10).

It would have been obvious to one having ordinary skill in the art to modify the invention of Goldfine and Zaretsky to specifically indicate that the conductivity is

sensed by a dielectric sensor, as taught by Harris, because, as suggested by Harris, the combination would have provided a method for measuring the conductivity, as required in Goldfine and Zaretsky, that would have allowed accurate and repeatable measurements with limited noise, thereby increasing the accuracy of the measurements (column 4, line 63 to column 5, line 15).

4. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goldfine et al. in view of Zaretsky et al. and further in view of U.S. Patent No. 4,876,511 to Clark.

As noted above, the invention of Goldfine and Zaretsky teaches many of the features of the claimed invention and while the combination does teach determining both the permittivity and conductivity (Goldfine, column 21, line 50 to column 22, line 42), as well as generating property estimation grids as magnitude-phase grids for determining the conductivity and thickness (Figure 29), the combination does not specifically include generating a phase-phase property estimation grid.

Clark teaches a method and apparatus for testing and calibrating an electromagnetic logging tool including means for transmitting electromagnetic waves to excite conduction currents wherein the difference between two different phases are used to determine the conductivity and permittivity (column 3, line 63 to column 4, line 8).

It would have been obvious to one having ordinary skill in the art to modify the invention of Goldfine and Zaretsky to include generating a phase-phase property

estimation grid because Goldfine and Zaretsky does teach determining both the permittivity and conductivity and, as suggested by Clark, the combination would have provided a means for determining these values by using a property estimation grid displaying the well-known relationship between phase-shift, permittivity, and conductivity (column 3, line 63 to column 4, line 8).

5. Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldfine et al. in view of Zaretsky et al. and further in view of U.S. Patent No. 5,223,796 to Waldman et al.

As noted above, the invention of Goldfine and Zaretsky teaches all of the features of the claimed invention except for specifying that the operating point parameters are temperature dependent and variations in the temperature are used to alter the operating point parameters or specifying that the material be monitored as part of a quality control process.

Waldman teaches apparatus and methods for measuring the dielectric and geometric properties of a material under test with operating parameters of the material under test affecting the monitored signal (column 7, lines 20-27) comprising specifying the configuration, properties, and geometry of testing electrodes (column 8, lines 27-66 and column 9, lines 37-53) and including a temperature sensor that measures the temperature of the material under test in order to compensate the measured operating parameters of the material under test (column 11, lines 23-34). Waldman also teaches plotting and adjusting measured parameters using property

curves (column 15, lines 49-66) and generating a continuum model using defined matrices (column 16, lines 40-67). Further, Waldman teaches sending measured results to a remote computer for online quality control (column 11, lines 14-22).

It would have been obvious to one having ordinary skill in the art to modify the invention of Goldfine and Zaretsky to include specifying that the operating point parameters are temperature dependent and variations in the temperature are used to alter the operating point parameters and specifying that the material be monitored as part of a quality control process, as taught by Waldman, because Waldman suggests that the combination would have produced a higher degree of accuracy by compensating for variations caused by temperature (column 11, lines 23-34) as well as allowed the user of the method to obtain desired results by monitoring the results continuously and making changes accordingly to maintain the necessary output (column 11, lines 14-22).

6. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goldfine et al. in view of Zaretsky et al. and Harris and further in view of U.S. Patent No. 5,223,796 to Waldman et al.

As noted above, Goldfine in combination with Zaretsky and Harris teaches all of the features of the claimed invention except for specifying that the operating point parameters are temperature dependent and variations in the temperature are used to alter the operating point parameters.

Waldman teaches apparatus and methods for measuring the dielectric and geometric properties of a material under test with operating parameters of the material under test affecting the monitored signal (column 7, lines 20-27) comprising specifying the configuration, properties, and geometry of testing electrodes (column 8, lines 27-66 and column 9, lines 37-53) and including a temperature sensor that measures the temperature of the material under test in order to compensate the measured operating parameters of the material under test (column 11, lines 23-34). Waldman also teaches plotting and adjusting measured parameters using property curves (column 15, lines 49-66) and generating a continuum model using defined matrices (column 16, lines 40-67). Further, Waldman teaches sending measured results to a remote computer for online quality control (column 11, lines 14-22).

It would have been obvious to one having ordinary skill in the art to modify the invention of Goldfine, Zaretsky, and Harris to include specifying that the operating point parameters are temperature dependent and variations in the temperature are used to alter the operating point parameters, as taught by Waldman, because Waldman suggests that the combination would have produced a higher degree of accuracy by compensating for variations caused by temperature (column 11, lines 23-34) as well as allowed the user of the method to obtain desired results by monitoring the results continuously and making changes accordingly to maintain the necessary output (column 11, lines 14-22).

Response to Arguments

7. Applicant's arguments with respect to claims 2, 3, 5-17 and 30-32 have been considered but are moot in view of the new ground(s) of rejection.

The following arguments, however, are noted.

Applicant first argues that "[t]he present claims relate to methods for generating property estimation grids. Only Goldfine et al. suggests property estimation grids and thus only Goldfine et al. is relevant to the claimed invention. Whereas Goldfine et al. is related to estimation grids used with magnetometers, the present invention is directed to measurement grids with dielectrometers. That distinction alone is sufficient to distinguish the subject claims since, as discussed in the application, dielectrometers present significantly different considerations."

The Examiner maintains that Goldfine specifically states that "Depending on the application, the MQS/EQS device may be operated in an MQS mode and/or an MQS/EQS mode and/or an EQS mode" (column 6, lines 35-37), wherein the device is to extend the operation of "exiting MQS magnetometers and EQS dielectometers" (column 6, lines 14-15), and therefore applies to both magnetometers and dielectrometers.

Applicant then argues that "claim 2 distinguishes Goldfine et al. not only in reference to a dielectometer, but also in the recitation of computation of 'a terminal relation value for each penetration depth' and 'recording in a database the terminal relation value for each penetration depth relative to the material properties as a

property estimation grid point.' Computation of terminal relation values for each of two penetration depths is not suggested by Goldfine et al."

The Examiner maintains that Goldfine discloses the magnitude-magnitude plot providing at least two values of thickness and conductivity (column 9, lines 56-60 and Figure 29) and recording a terminal relation value for each thickness and conductivity (column 25, lines 12-24) wherein the conductivity varies the field penetration/skin depth relative to the material properties (column 29, lines 29-36 and column 32, lines 3-8).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,304,002 to Shervin teaches a method of determining blend time in stirred tanks using a using a "dielectric (conductivity) sensor 4".

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw
April 26, 2005

PATRICK ASSOUAD
PRIMARY EXAMINER